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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/720,716	11/24/2003	Peter C. Song	64032/P010US/10309493	5403
29053	7590	05/23/2005	EXAMINER	
DALLAS OFFICE OF FULBRIGHT & JAWORSKI L.L.P.			DINH, TRINH VO	
2200 ROSS AVENUE			ART UNIT	
SUITE 2800			PAPER NUMBER	
DALLAS, TX 75201-2784			2821	

DATE MAILED: 05/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/720,716

Applicant(s)

SONG ET AL.

Examiner

Trinh Vo Dinh

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 May 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-128 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-45, 47-62 and 64-127 is/are rejected.
- 7) ☒ Claim(s) 46, 63 and 128 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11/24/03 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 05/02/05, 11/24/03.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o).

In claim 27, the recitation “diversity monopole feed element” found no support in the specification. Correction of the following is required.

Information Disclosure Statement

2. The Examiner has crossed out the International Search Report listed under Non-Patent Literature Documents because no copy of the report is submitted.

Claim Objections

3. Claims 6, 14 and 29 are objected to because of the following informalities:

In claim 6, “w herein” should be changed to --wherein--.

In claim 14, “elements” should be changed to --said elements--.

In claim 29, line 2, “are ultra wideband” and “define a planer disc” should be changed to --is ultra wind band-- and --defines a planar disc-- respectively.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 13, 21-23, 25, 27, 29-31, 38-41, 47-53, 56-58, 67-68, 71-73, 75-76, 86-87, 95-97, 100-101, 106-109 and 113-123 are rejected under 35 U.S.C. 112, second paragraph, as being

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indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claims 13, 67, 75 and 86, it is unclear what is meant by “the bands share an aperture”?

In claims 21 and 95, what is meant by “shaped” in a phrase “cross shaped feed element”?

In claims 23 and 97, what is meant by “shaped” in a phrase “cross shaped parasitic element”?

In claim 25, “said parasitic element” has no antecedent basis.

In claim 29, it is unclear what is meant by “said monopole feed element define a planer disc”?

In claims 27 and 100, what is meant by “said diversity monopole elements comprise a monopole feed element and a ground providing a differential path”?

In claim 30, it is unclear what is meant by “said monopole feed elements define a plurality of rings”?

In claim 31, it is unclear what is meant by “said monopole feed elements define a square”?

In claims 38 and 106, it is unclear what are meant by “integrated magnetic dipole” and “integrated electric dipole”?

In claims 47 and 112, what is meant by “directors extending a scanning angles if said array”?

In claims 51 and 116, “said lines’ has no antecedent basis. Is it meant by ‘said line lengths”?

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In claim 52, it is unclear what is meant by “said line lengths are provided by reduced size phase shift lines”?

In claim 56, line 2; it is unclear what “said line lengths” refer to. Since two “line lengths has been recited, one in line 1 of claim 56 and the other in line 1 of claim 51.

The deficiency is found in claims 57 or 58, line 2 would require the same clarification/correction.

In claim 71, line 9, it is unclear what is meant by “each of said plurality of elements” because there are two plurality of elements recited in the claim, one is a plurality of lower frequency antenna element and the other is a plurality of higher frequency antenna elements. Does it mean “each of said plurality of the lower frequency antenna elements and said plurality of higher frequency antenna elements”?

Claims 22, 39-41, 48-50, 53, 68, 72-73, 76, 87, 96, 107-109, 113-115, 117-123 are rejected because they depend on claims 21, 38, 47, 52, 67, 71, 75, 86, 95, 106, 112 and 116 respectively.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-11, 15-20, 26-28, 44, 51, 54-55, 59-62, 64-66, 69-70, 74, 77-78 drawn to an apparatus and the method claims 79-84, 88-89, 92-94, 99-101, 116, 119-120 and 124-127 are rejected under 35 U.S.C. 102(b) as being anticipated by Nishikawa et al (US 5,166,693).

With respect to claims 1-4, Nishikawa discloses, in Figs. 11 and 15, a plurality of antenna elements (114), an integrated feed network (col. 12, lines 38-45) feeding said elements from an input (160 in Fig. 1) and providing adaptive beam forming for said plurality of beams, said feed network (122, 124) comprising switched phase shifters (122. col. 13, lines 19+). Note that Nishikawa has the same structural configuration as claimed in claim 1. Therefore, although not explicitly stated in Nishikawa, it is inherently that the antenna elements provide the claimed functional recitation of a plurality of beam in different direction, each beams selectively having beam polarization or beam width.

With respect to claims 5-8, 64-65, 69, 74 and 77, Nishikawa further discloses the array defined within a panel (Fig. 11), and the feed network (122, 124) being defined on a printed circuit board (130 in Figs. 12 or 18-19, col. 15, lines 5-10), at least a portion of each of said antenna elements (114) being defined on said printed circuit board. Nishikawa further discloses the array being a wireless local area network antenna (col. 1).

With respect to claims 9-11 and 66 Nishikawa discloses, in Fig. 12, said feed network employs PIN diodes (151, col. 13, lines 19-20) as switches, and said diodes being disposed in the phase's shifters in a back-to-back configuration (Fig. 13).

With respect to claims 15-20, 70 and 78, Nishikawa discloses the array being broadband (col. 2, lines 45-47) and having high manufacturing tolerances. Note that the word "high" is merely a relative word. Nishikawa also discloses the antenna elements being arranged to provide reduced coupling (col. 5, lines 10-17), the antenna elements comprising stacked patch antenna elements (114 in Figs. 15 or 18, col. 2, lines 48+), the stacked patch antenna elements comprising a parasitic element (114) larger than a feed element (122, 124).

With respect to claims 26-28, Nishikawa discloses the antenna elements comprising diversity monopole elements (114) and monopole feed element (124) and a ground (116, 140) providing a differential path, and the ground is a ground plane (140 in Fig. 19) supporting said feed network (122, 124).

With respect to claims 44, 51, 54-55 and 59-62, Nishikawa discloses the array (114) being disposed on a flat surface (Fig. 11), and the phase shifters (122) define a plurality of line lengths to provide phase shifts by switching between line lengths (Fig. 12). Nishikawa further discloses the phase shifts (124) being discrete (Fig. 13) and diodes (151) disposed in line lengths to provide isolate of between the lines (Fig. 13). Furthermore, Nishikawa discloses the feed network (122, 124) feeding the elements in two orthogonal branches (Fig. 14), and a phase shifter (122) and a switch (col. 12, line 35 to col. 13, line 25). Nishikawa also discloses the feed network (122, 124) comprising a different feed for the antenna elements (Fig. 11) and the different feeds providing signals to the antenna elements 180 degrees out of phase (col. 17, lines 25-27).

With respect to claims 79-84, 88-89, 92-94, 99-101, 116, 119-120, and 124-127 the apparatus discussed above would perform the claimed method.

8. Claims 1 and 12 drawn to an apparatus and the method claims 79, 85 and 90-91 are rejected under 35 U.S.C. 102(b) as being anticipated by Yamazaki (US 5,561,434).

With respect to claims 1, 12 and 14, Yamazaki discloses, in Fig. 4A, a plurality of antenna elements (HAn, LAn), an integrated feed network (HMn, LMn) feeding said elements from an input (Fig. 4A) and providing adaptive beam forming for said plurality of beams, said feed network (HMn, LMn) comprising switched phase shifters ((HMn, LMn in Figs. 8-9, or 1003

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in Fig. 10). Note that Nishikawa has the same structural configuration as claimed in claim 1.

Therefore, although not explicitly stated in Nishikawa, it is inherently that the antenna elements provide the claimed functional recitation of a plurality of beam in different direction, each beams selectively having beam polarization or beam width. Yamazaki further discloses the array (abstract) being multi-band (abstract). Yamazaki also discloses the antenna elements (HAn, LAn) for different bands being interleaved (in Fig. 4A).

With respect to claims 79, 85 and 90-91, the apparatus discussed above would perform the claimed method.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claim 24 draw to the apparatus and the method claim 98 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishikawa.

With respect to claim 24, Nishikawa discloses every feature of the claimed invention except the patch element being square element. However, it would have been an obvious matter of design choice to have the antenna in square shape, since such a modification would have involved a mere change in the shape of a component. A change in shape is generally recognized as being within the level of ordinary skill in the art (refer to US patent 5,610, 617 or 5,534,877 for teaching of square patch antenna 32).

With respect to claim 98, the apparatus discussed above would perform the claimed method.

11. Claims 32-33 draw to the apparatus and the method claims 102-103 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishikawa in view of Kitsch et al (US 5,990,835).

Respecting claim 32-33, Nishikawa discloses every feature of the claimed invention except a ground reflector. Kuntzsch discloses a reflector (120) positioned behind the antenna elements (114). It would have been obvious to one having ordinary skill in the art to provide Nishikawa's antenna array with a reflector which is positioned behind the antenna element in order to improve antenna's characteristic such as front-to back performance.

With respect to claims 102-103, the apparatus discussed above would perform the claimed method.

12. Claims 34-37 draw to the apparatus and the method claims 104-105 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishikawa in view of Stotler et al (US 6,731,245).

Respecting claim 34, Nishikawa discloses substantially the claimed invention as noted above in claim 1. However, Nishikawa does not suggest the antenna elements comprising slot integrated patch antenna elements. Stotler discloses, in Fig.1 or 3, antenna elements (104) comprising slot integrated patch antenna elements (106). It would have been obvious to one having ordinary skill in the art at the time the invention was made to configure Nishikawa's antenna elements as the slot patch antenna element as taught by Stotler. Doing so would reduce the resonant frequency and increase the antenna 's bandwidth.

With respect to claim 35-37, Stotler discloses the slot integrated patch antenna (104) being feed. Note that Nishikawa has the same structural configuration as claimed in claim 34.

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Therefore, although not explicitly stated in Stotler, the slot integrated patch antenna elements are feed to provide functional recitations as claimed in claims 35-37 such as branch diversity and polarization diversity.

With respect to claims 104-105, the apparatus discussed above would perform the claimed method.

13. Claim 42-43 draw to the apparatus and the method claims 110-111 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishikawa.

Respecting claims 42-43, Nishikawa discloses every feature of the claimed invention except spacing of the elements being .64 wavelengths. However, selecting antenna's spacing based on the operation frequencies has been well known practice in the art. Therefore, arranging Nishikawa 's antenna elements .64 wavelength apart to achieve desired scanning angle and gain would have been an obvious to one skill in the art (Refer to US 6,795,020 which discloses selecting antenna elements' spacing).

With respect to claims 110-111, the apparatus discussed above would perform the claimed method.

14. Claim 45 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nishikawa in view of Tillery et al (US 2004/0150561).

Nishikawa discloses every feature of the claimed invention except the array being disposed on a curved surface. Tillery discloses, in Fig. 10, an antenna array (24) being disposed on a curved surface (92). It would have been obvious to one having ordinary skill in the art at the time the invention was made to arrange Nishikawa's array on the curved structure as taught by

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Tillery on order to attain reduced cost while maintaining acceptable electrical performance of the antenna array as stated in Tillery: paragraph [0008].

Allowable Subject Matter

15. Claim 25 would be allowable if rewritten to overcome the rejection(s) under 35

U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

16. Claims 46, 63 and 128 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

17. The following is a statement of reasons for the indication of allowable subject matter:

The cited art of record fail to teach the parasitic element being spaced in a range of 0.3 to 0.8 wavelength from the feed element as defined in claim 25, or controls having fault detection provided by current sensing to assess the current drawn by the phase shifter of the feed network to determine proper operation of the feed network phase shifters as defined in claims 63 and 128.

Inquiry

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Trinh Vo Dinh whose telephone number is (571) 272-1821. The examiner can normally be reached on Monday to Friday from 9:30AM to 6:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Don Wong, can be reached on (571) 272-1834. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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A handwritten signature in black ink, appearing to read 'Trinh Vo Dinh', followed by a long horizontal flourish line.

Trinh Vo Dinh

May 15, 2005